

(B) ascertaining the differences between the prior art and the claims in issue; (C) resolving the level of ordinary skill in the pertinent art; and (D) evaluating evidence of secondary considerations. Of course, the references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; Hodosh v. Block Drug Co. Inc. 786 F.2d 1136 (Fed. Cir. 1986).

Claims 5 – 6 are specifically limited to (a) a *partial rotation torque motor* with a rotatable shaft, which has (b) *all ceramic components* of a ball bearing assembly, and (c) in which the shaft and the bearing support *structures have the same CTE as the bearing components*. This combination of features is the essence of the invention. Claim 7 further limits the device to having the shaft and bearing support be a nickel-iron alloy. The advantages of the claimed structure for a partial rotation device were fully discussed in the specification.

The Office alleges Gadhok to “substantially teach the claimed invention except that it does not show that the shaft and the bearing support structure having the same coefficient of thermal expansion as the ceramic bearing assemblies [and] ... does not disclose ... ceramic bearing assemblies comprising a ceramic inner race, ceramic bearing balls, and a ceramic outer race.” Applicant respectfully asserts this to be an express statement that the invention is totally absent in Gadhok. The reference to using commercially available ceramic bearing balls is made by Gadhok absent of any connection or suggestion or appreciation of the benefits of using a full ceramic bearing assembly with comparable CTE bearing support and rotor structure. *It is both indicative of the state of the art in this respect, and supportive of the Applicant's following remarks, that a recent patent on a galvanometer scanner limited rotation motor is void of any suggestion of the instant invention.*

Further, Applicant respectfully notes its priority date is Jan. 11, 2000. The filing date of Gadhok's '359 is Jul. 20, 1999, but the issue/publication date is Oct. 16, 2001. To be prior art under 35 USC 103, the art must qualify as prior art under 35 USC 102; Panduit Corp. v. Dennison Mfg. Co., 810 F.2d 1561, 1568. The date that the patent is made available to the public is the date it is available as a 35 USC 102(a) or (b) reference; In re Ekenstam, 256 F.2d

321. No other paragraph of 35 USC 102 is applicable as to Gadhok in this context. Therefore, Gadhok's patent does not qualify as prior art under 102 or 103, except to the extent that it is representative of the state of the art to some degree, as of the time of this Applicant's priority date; Ex parte Erlich, 22 USPQ 1463. Applicant respectfully requests Gadhok be withdrawn due to the publication date post dating the Applicant's priority date.

The Stangeland '146 disclosure of *bearing races* for bearing assemblies is directed to rotating machinery operating dry or in the presence of cryogenic propellants. It does disclose a graduated metal to metal-ceramic finish, bearing assembly with CTE matched to shaft and bearing support housing. However, there is no appreciation expressed or suggested as to the special characteristics of galvanometer-type partial rotation torque motors, including their small size, low inertia, high speed, precision alignment, and longevity requirements at issue in this applicant's disclosure, and no suggestion that using *all ceramic* components for the bearing assembly, rather than metal components, would be viable or helpful.

Furthermore, there is no particular aspect of this disclosure that would suggest using it or combining it with Gadhok, to a skilled practitioner attempting to meet the goals of this Applicant's invention, without impermissible Hodosh hindsight. While the Stangeland invention resides as a feature within a component of a bearing assembly, the difference in function between this particular feature of a bearing raceway and the invention's partial rotation torque motor with all ceramic bearing components and matched CTE shaft and bearing support is entitled to great weight; In re Ellis, 476 F.2d 1370 (CCPA 1973). Indeed, as any practitioner will readily attest, galvanometer scanner motors today are a very specialized subset of rotary devices in general, and *cannot* be construed as "common everyday mechanisms", the problems of which may be susceptible of improvements coming from a "broad spectrum of prior art"; Stevenson v. International Trade Comm., 612 F.2d 546 (CCPA 1979).

The above comments support the Applicant's position that Gadhok is either supportive in its absence of any indicia of the claimed invention, or should be withdrawn, that nothing in Stangeland would motivate one to combine it with Gadhok, and that neither Gadhok nor

Stangeland nor the combination obviates the claimed invention under the Graham rule. It is not whether the individual differences themselves would have been obvious, but whether the claimed invention *as a whole* would have been obvious in the combination; Stratoflex, Inc. v. Aeroquip Corp. 713 F.2d 782, Fed. Cir. 1983). Based on these remarks, Applicant respectfully requests the rejection be withdrawn and claims 5 – 7 be reconsidered.

The Office rejected claims 8-11 under 35 USC 103(a) as unpatentable over Gadhok in view of Stangeland as applied above, in further view of Braunagel's '241; alleging that Braunagel discloses a shaft electrically isolated from the bearing support.

Applicant invokes its prior remarks with respect to 35 USC 103, and to the art of Gadhok and Stangeland as applied to the claims. Applicant reiterates that galvanometer scanner motors today are a very specialized subset of rotating devices, and *cannot* be construed as "common everyday mechanisms", the problems of which may be susceptible of improvements coming from a "broad spectrum of prior art"; Stevenson.

Reviewing the claims first, claim 8 is dependent on claim 5, previously described, expressly adding the further limitation of electrical isolation between the shaft and the bearing support. Applicant acknowledges Braunagel's recitation of the same feature, but it is used here as a dependent limitation, and should therefore be allowable with respect to an allowable base claim.

Claim 9 is substantially a repetition of the elements of claims 5 – 8, containing at least all the recited structural limitations thereof. If any combination of claims 5 – 8 is allowable, claim 9 should also be allowable.

Claims 10 and 11 are substantially a repetition of the elements of claim 9, with the further structural limitation of a *reversibly* rotatable shaft *restricted to less than one turn*. If claim 9 is allowable, claims 10 and 11 should also be allowable. Claim set 10 and 11 should be independently allowable as well.

Traversing the rejection, Gadhok and Stangeland were discussed above. The rejection extended to the 1965 Braunagel disclosure, the focus of which is a general purpose bearing assembly of mixed components, some ceramic and some metal. There is an inner ceramic race maintained under compression with spaced apart metal rings or bands, and an outer ceramic race maintained under compression by a metal jacket. The spaces between the metal rings is occupied by ceramic roller bearings. The compressive effect of the metal rings and jacket components on the ceramic races is apparently intended to reinforce and control expansion sufficiently to maintain an acceptable level of bearing precision, while offering the other benefits of ceramic bearing contact surfaces. As noted above, it does disclose providing electrical isolation of the inner race from the outer race, effectively offering isolation of the shaft from the stator or bearing supports.

As in the Stangeland case, the Braunagel bearings are directed to a broad range of applications in all manner of rotating machinery in all manner of environments, in distinction to the very specialized subset of partial rotation torque motors which is the focus of this invention. There is no consideration in the Braunagel bearing disclosure of the interrelated opportunities or effects of the design, size, material, weight, strength, or in particular, the thermal characteristics of the rotor, stator or bearing support structure in which the bearing might be applied.

The bearing itself is inherently bulky and heavy relative to the application at issue. The preferred embodiment is illustrated as a roller bearing, unsuitable for the Applicant's case. The inner race was particularly cited by the Applicant as being preferably very light for inertial reasons, contrary to the metal rings of Braunagel. It would be immediately apparent to one skilled in the art, even with Gadhok and Stangeland in hand, that the Braunagel bearing is incompatible with a Gadhok type device.

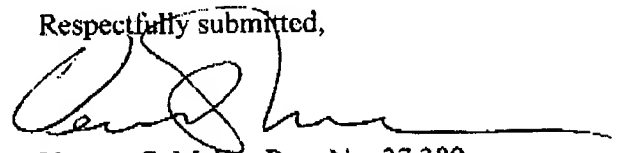
Nor is it apparent that Stangeland offers an attractive bridge between the two to make the alleged combination. It is not whether the individual differences themselves would have been obvious, but whether the claimed invention *as a whole* would have been obvious in the

combination; Stratoflex. For these reasons, Applicant respectfully requests withdrawal of the rejection of claims 8 – 11 and reconsideration of the claim set as previously submitted.

The Office cites as pertinent and Applicant acknowledges the additional art of Rokkaku and Harris. Rokkaku is an all ceramic bearing assembly without a specific application. Harris is not pertinent to the application.

Applicant believes the above remarks to be responsive to the Office correspondence, and respectfully requests reconsideration of the claims. No new matter is added. Please contact the undersigned if there is any question or opportunity to advance the case.

Respectfully submitted,



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